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ABSTRACT

To determine whether reading and writing are as closely related as commonly supposed, a study estimated the amount of overlap that exists between several components of reading and writing knowledge. Data were obtained from 256 second graders and 251 fifth graders. Reading measures included tests of phonics (word knowledge), vocabulary (lexical knowledge), sentence comprehension (syntactic knowledge), and passage comprehension (organizational or structural knowledge). Writing measures included assessments of spelling ability (word knowledge), vocabulary diversity (lexical knowledge), sentence structure complexity (syntactic knowledge), and story grammar structure (organizational or structural knowledge). In all, there were eight writing measures and four reading measures. Each measure was used as a dependent variable in a separate multiple regression analysis. Results did not support the idea that reading and writing are identical in terms of underlying knowledge. The correlations between the reading and writing variables were significant, but they were much lower than would be expected given the assumptions regarding the relationship between reading and writing. (HOD)

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The Shared Knowledge of Reading and Writing

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The Shared Knowledge of Reading and Writing

It is proposed frequently that, to enhance reading achievement, writing instruction should replace or be integrated with reading instruction (Graves, 1978; Rubin & Hansen, 1984; Shanahan, 1980; Stotsky, 1983). Such proposals are based upon the assumption that the underlying knowledge used in reading and writing is common to both. Reading and writing, according to these views, are so similar that instruction in one must lead to improvement in the other. This paper will examine empirically the similarity of reading and writing knowledge and will propose future research directions for examining the reading writing relationship.

The idea that writing activity necessarily or automatically improves reading improvement has become pervasive in the field. "Writing requires writers to focus on words and their meaning. The vocabulary building that results inevitably improves children's ability to understand what they read" (Cramer, 1978, p. 153). Hoskisson (1979, p. 894) claims, "children will learn to read by learning to write," and that we should "put the emphasis on writing

in school and not on reading." Graves and Murray (1980) go even further in their suggestion that it would be reasonable to reduce the amount of reading instruction, in favor of writing instruction, with no possibility of a subsequent decline in reading achievement.

These proposals assume that reading and writing rely upon identical knowledge, the enhancement of which will lead automatically to gains in both. For example, Odell (1980, p. 140) says that, "the act of reading -- the act of comprehending, evaluating, analyzing, synthesizing written discourse -- requires one to engage in the same cognitive activities that can enable one to formulate the assertions he or she will develop in writing." Squire (1983, p. 582) indicates that "both comprehending and composing seem basic reflections of the same cognitive process."

There are many types of knowledge that are commonly believed to be shared by reading and writing (Rubin & Hansen, 1984). One aspect of knowledge that is often claimed to underlie both reading and writing is the word knowledge that is basic to spelling and word recognition (Harste, Woodward & Burke, 1984; Mason, McDaniel & Callaway, 1974). Lexical knowledge, the understanding of word meanings, is another knowledge component often supposed to be identical in reading and writing (Takala, 1984). Syntax (Evanechko, Ollila & Armstrong, 1974; Loban, 1976), story structure (Applebee, 1978; Gordon & Braun, 1982) and cohesion (Rentel & King, 1983) are additional aspects of knowledge frequently claimed to be common to reading and writing. There are also hypotheses about the sharing of transactional knowledge (Graves & Hansen, 1983); aesthetic knowledge (Rubin & Hansen, 1984); and strategic knowledge (Birnbaum, 1982; Shanahan, 1984; Tierney & Leys, 1984).

But are reading and writing as closely related as is commonly supposed? Should we expect writing instruction to enhance reading achievement automatically? The purpose of this study is to provide answers to these questions by estimating the amount of overlap that exists between several components of reading and writing knowledge.

METHOD

Subjects

Twelve second grade and nine fifth grade classes participated in this study. These classes represented a heterogeneous sample with respect to race (75% Caucasian, 21% black, 4% other), sex (50% male), and SES (36% from low SES schools). Complete data were obtained from 256 second graders and 251 fifth graders.

Test Instruments and Procedures

The measures used in this study were selected to provide valid and reliable assessments of some of the components of knowledge claimed to be part of both reading and writing. Measures were selected to provide similar reading and writing estimates of the various knowledge components. The measures required that subjects use or demonstrate various types of knowledge in reading and writing. This study focused on word knowledge, lexical knowledge, syntactic knowledge, and organizational or prose structure knowledge. Reading measures included tests of phonics (word knowledge), vocabulary (lexical knowledge), sentence comprehension (syntactic knowledge), and passage comprehension (organizational or structural knowledge). Writing measures included assessments of spelling ability (word knowledge), vocabulary diversity (lexical knowledge), sentence structure complexity (syntactic

knowledge), and story grammar structure (organizational or structural knowledge).

Second graders completed the Phonetic Analysis Test of the Stanford Diagnostic Reading Tests (SDRT); the Reading Comprehension Test of the Gates-MacGinitie Reading Tests (GMRT); the Vocabulary Test of the SDRT, and a limited cloze test (Cunningham & Cunningham, 1978). Fifth graders completed the Phonetic Analysis Test of the SDRT; the Reading Comprehension Test of the SDRT; the Vocabulary Test of the GMRT; and a limited cloze test. The subjects at both grade levels completed a grade level appropriate spelling test that was analyzed for Standard English spelling accuracy, phonemic accuracy, and visual accuracy (i.e., an estimate of how much the spellings looked like Standard English). Subjects each wrote two stories that were analyzed for mean t-unit length, vocabulary diversity, and the existence of various story grammar features (Stein, 1978), including number of events, numbers of story structure categories, and amount of information. In all, there were eight writing measures and four reading measures. For additional description of the actual measures (validity, reliability, etc.) and the data collection procedures, the reader is referred to Shanahan (1984).

Analysis

Each measure was used as a dependent variable in a separate multiple regression analysis. The independent variables for each analysis consisted of all of the variables from the opposite set. That is, when a reading variable was used as the dependent measure, the independent variables were the eight writing and spelling variables. When each of the writing variables was used as a dependent measure, the four reading variables were used as the

independent variables. Each regression was run twice, once with the second grade data and once with the fifth grade data. In all, 24 separate regressions were computed.

RESULTS

The results of the 24 regressions are summarized in Table 1. The amount of variance explained in each of the dependent variables ranges from .04 to .55. The mean $\underline{R}^2$ is .31 and the median R^2 is .40 for all 24 analyses. With a few exceptions, the reading regressions, those in which reading measures were used as dependent variables resulted in significantly higher amounts of variance explanation (Mean $\underline{R}.^2$ = .42) than did the writing regressions (Mean $\underline{R}.^2$ = .25).

Insert Table 1 about here.

Discussion

The idea that reading and writing are identical, in terms of underlying knowledge, does not appear to be true. The correlations between the reading and writing variables examined here were significant, but they were much lower than would be expected given the assumption of identicality. The correlations are low enough that it would be unwise to expect automatic improvements to derive from the combination of reading and writing or from the replacement of one with the other.

Unreliability of measurement probably imposed some limitation on the size of the correlations. However, it should be noted that for those measures for

which alternate form or test-retest reliability information existed, the reliability coefficients were .85 or higher. The rest of the measures had inter-rater and intra-rater reliabilities in the .90's. In other words, the imperfect reliability of measurement is only a partial explanation of the limited amount of overlap that exists between reading and writing.

Another point that should be made was that these measures were similar, but not entirely analogous. For example, the story structure knowledge measured in students writing might only have incidental importance in the passage comprehension that is useful in completing a standardized comprehension test. The more similar the measures, the higher the correlations. The spelling and word recognition measures were found to be closely related. Nevertheless, even with well matched measures the relationships were much below what would be expected if reading and writing were identical.

It should be noted that this analysis might be providing an over-estimation of the reading-writing relationship, because <u>all</u> of the reading measures were used to predict each writing variable, and <u>all</u> of the writing measures were used to explain each reading variable. If only similar measures were used, such as word recognition and word production or syntactic complexity and sentence level comprehension, the correlations would certainly be significantly lower. This analysis capitalizes on chance relations; it probably represents an overestimation of the actual amount of overlap that actually exists between reading and writing.

It could be argued that each of the regressions only tells part of the story, and that if the results were somehow combined across analyses, the

overall variance explanation would be substantially higher. Although this argument is intriguing and seems logical given the strength of opinion in this area, it is incorrect. Analyses (Shanahan, 1984; Shanahan & Lomax, in press) that permit the calculation of all of the relationships simultaneously between multiple sets of variables (i.e., canonical analysis, LISREL) do not result in significantly higher estimates of relationship than were apparent here. There is a great deal of collinearity in these verbal measures and combining them does not result in the estimation of more powerful relationships.

It is clear from this analysis that reading and writing overlap, but that they are not identical. This counter-intuitive finding requires some explanation. One possibility is that reading and writing are based upon separate knowledge structures. However, this explanation is not consonant with what we know about the structure of human memory, nor is it a very parsimonious explanation given the amount of overlap that does exist. This explanation would require three knowledge bases, one that could be accessed only during reading, another that could be accessed only during writing, and a third that was shared by both and that could be utilized by either.

Another, more reasonable, explanation would focus on the non-symmetrical nature of some knowledge. An example of this is the non-equivalence of sound-symbol relationship rules (Cronnell, 1970). Some rules are useful guides to pronunciation, but those same rules can be useless as guides to spelling production. Such non-equivalence would result in moderately high correlations, but identicality would not be expected. If the limited overlap of reading and writing is due to such non-equivalence, then the role of research would be to try to identify the structural rules underlying reading and writing.

A final explanation for the lack of overlap focuses on memory processes, rather than on the structures or contents of memory. Memory access requires some kind of stimulus, either external or internal, that allows the individual to "pull back" or access certain memories. If these access routes are unequal, then it would be expected that knowledge that would be equally useful to reading or writing, might not be equally accessible. It is possible that new knowledge becomes attached to the function for which it was originally learned. If a new vocabulary word is learned in reading, it might remain "functionally fixed" to reading unless the learner understands its generalizability. If students are not aware of the possiblity of using writing knowledge in reading and vice-versa, then equivalent knowledge might not be used automatically across reading and writing. Future research needs to explore the relationship between reading and writing overlap and the uses of literacy. Investigations should examine the possibility that relationships will be stronger in those contexts that make the learner metacognitively aware of the potential for knowledge sharing between reading and writing.

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Table 1. Amount of variance explained in each writing measure by all of the reading variables and in each reading measure by all of the writing variables.

DEPENDENT MEASURES	R^2	
Writing	Grade 2	Grade 5
Spelling-Standard	.55	.51
Spelling-Phonemic	.42	.45
Spelling-Visual	.50	.47
Vocabulary Diversity	.23	.23
Avg. T-Unit Length	.12	.04
Story Grammar-Events	.07	.04
Story Grammar-Categories	.15	.11
Story Grammar-Information	.13	.06
Reading:		
Phonics	.50	.45
Vocabulary	.28	.48
Cloze	.47	.41
Comprehension	.42	.38
Mean	.32	.33
Median	.35	.40